

31. A pad refurbisher for refurbishing a polishing surface on a polishing pad used in chemical-mechanical polishing of a semiconductor wafer, comprising:

a body adapted for attachment to a wafer carrier of a chemical-mechanical polishing machine with the body having a face positioned proximate to a perimeter portion of the wafer carrier and facing the polishing surface of the polishing pad; and

a refurbishing element connected to the face of the body, the refurbishing element being adapted to engage the polishing surface substantially adjacent to the perimeter portion of the wafer carrier.

32. The pad refurbisher of claim 31 wherein the body is fixed to the wafer carrier.

33. The pad refurbisher of claim 1 wherein the body is slidably attached to the wafer carrier.

34. The pad refurbisher of claim 33, further comprising a linear actuator attached to the body, wherein the actuator independently moves the body with respect to the wafer carrier along an axis substantially normal to the polishing surface to selectively engage the refurbishing element with areas on the polishing surface in need of cleansing and to selectively disengage the refurbishing element from areas on the pad in adequate condition.

35. The pad refurbisher of claim 31 wherein the face is a distal face of the body defining a ring positioned radially outwardly from the perimeter of the wafer carrier.

36. The pad refurbisher of claim 31 wherein the body has a plurality of arcuate segments positioned radially outwardly from the perimeter of the wafer carrier, the arcuate segments being spaced apart from one another around the wafer carrier and each arcuate segment having a distal face facing generally towards the polishing surface of the polishing pad.

37. The pad refurbisher of claim 31 wherein the refurbishing element is a brush comprising a plurality of bristles extending downwardly from the face towards the polishing surface, the bristles engaging the polishing surface to clean waste particles from the pad.

38. The pad refurbisher of claim 31 wherein the refurbishing element is a pad conditioner that removes a layer of pad material from polishing surface of the pad to form a new polishing surface on the polishing pad.

39. The pad refurbisher of claim 38 wherein the pad conditioner comprises a pad with a plurality of embedded diamonds, the pad being connected to the distal surface of the body.

40. The pad refurbisher of claim 31 wherein the body has a first ring with a first refurbishing element and a second ring with a second refurbishing element, the first ring being positioned radially outwardly from the perimeter of the wafer carrier and the second ring being positioned radially outwardly from the first ring.

41. The pad refurbisher of claim 40 wherein the first refurbishing element is a pad cleaner and the second refurbishing element is a pad conditioner.

42. The pad refurbisher of claim 31 wherein the body is adapted to be symmetrically positioned about the center of the wafer carrier.

43. A polishing machine for chemical-mechanical polishing of a semiconductor wafer, comprising:

a platen having an upper surface;

a polishing pad positioned on the upper surface of the platen, the polishing pad having a polishing surface facing away from the platen;

a wafer carrier for carrying the wafer; and
a pad refurbisher having a body attached to the wafer carrier and having a
refurbishing element.

44. The polishing machine of claim 43 wherein the body comprises a face
positioned proximate to a perimeter portion of the wafer carrier and facing generally towards the
polishing surface.

45. The polishing machine of claim 44 wherein the refurbishing element is
connected to the face, and wherein the body being attached to the wafer carrier so that the body
and refurbishing element travel with the wafer carrier as the wafer carrier moves with respect to
the polishing pad, and wherein the refurbishing element engages the polishing surface
substantially adjacent to the perimeter portion of the wafer carrier while the wafer carrier moves
the wafer over the polishing surface.

46. The polishing machine of claim 43 wherein the body is fixed to the wafer
carrier.

47. A method for refurbishing a polishing pad, comprising the steps of:
providing a pad refurbisher attached to a wafer carrier, the pad refurbisher having
a refurbishing element;
selectively engaging the pad refurbishing element with the polishing pad; and
moving at least one of the wafer carrier and the polishing pad with respect to the
other to pass the refurbishing element across the polishing pad.

48. The method of claim 47 wherein selectively engaging comprises
selectively lowering the refurbishing element towards the polishing pad while the wafer carrier
presses a wafer against the polishing pad and moves the wafer over the polishing pad to polish
the wafer.